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Identifying mitigation measures to enhance surface water quality – a coupled modeling approach.

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Major reservoirs are a key element for public water supply in many countries. In Europe over 800 major reservoirs serve primarily this purpose. Eutrophication affects significant numbers of lakes and reservoirs, and is the well-known issue currently impacting drinking water supply reservoirs. In most cases, phosphorus is the principal cause of eutrophication, and therefore has been studied intensively. The presence of micro pollutants (e.g. pesticides, pharmaceutically active compounds - PhaCs) is not systematically monitored but some substances are very mobile and tend to resist degradation. Such contaminants have been detected in numerous surface water bodies (lakes, reservoirs and rivers). As agriculture is intensifying and land use is changing in many areas, the impact of diffuse pollution on water quality is expected to be more pervasive in the future.

The project Aquisafe proposes to investigate the topic in a multi-step approach which will include: i) an analysis of the nature, occurrence and risk of surface water contamination, ii) a modelling approach to quantify the contaminants origin, load and repartition to assess the effects of adapted controlled measures, and iii) the development, adaptation or optimisation of the design and operation of mitigation zones (riparian corridors and small scale wetlands) to reduce downstream loads of pollutants. Thus, Aquisafe is a first step to establish the state-of-the-knowledge on current existing solutions, identify emerging issues and assess the feasibility of using models for the evaluation of mitigation zones for contaminants removal.

Currently there are a couple of models which consider nutrient transport on a catchments scale. In terms of contaminants the number of available models on that scale is low. We present a coupled modelling approach in order to quantify the input of nutrients and trace contaminants into surface water bodies in a small catchment in France. We will show which areas are relevant for establishing mitigation zones (constructed wetlands or riparian corridors), which proportion they have related to the remaining catchment and which aspects have to be considered to mitigate nutrients and contaminants respectively. Furthermore, it will illustrate which kinds of mitigation zone have the highest impact on water quality.